DOCUMENT RESUME

ED 227 379 CG 016 507

AUTHOR McDonald, Charles H.
TITLE A Validation of Cognitive Evaluation Theory.
PUB DATE May 82
NOTE 20p.; Paper presented at the Annual Meeting of the Midwestern Psychological Association (54th, Minneapolis, MN, May 6-8, 1982).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Cognitive Measurement; Comparative Testing; Compensation (Remuneration); Competence; Feedback; High Schools; High School Students; *Motivation Techniques; *Rewards
IDENTIFIERS *Intrinsic Motivation; Praise

ABSTRACT

The role of money and other types of feedback on motivation to do a task or job has long been of interest to managers in business. To examine Deci's hypothesis concerning the effects of contingent rewards on intrinsic task interest, 42 high school students worked puzzles involving the solution of mazes and anagrams. Competence in task was made salient by verbal praise in one condition, while in another verbal praise was used to recognize the obligatory nature of the task performance. In a third condition various monetary rewards were given as tasks were performed to make salient "above average competence," and in the fourth condition students were told they would receive one dollar for helping with the experiment. Optional puzzle items could be completed after the experiment. Students in the verbal praise for competence condition reported significantly higher task interest than those in the verbal feedback obligation or monetary payment for obligation students. The findings suggest that verbal praise for competence can be highly effective. (Author/JAC)

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A Validation of Cognitive Evaluation Theory

Charles H. McDonald

Drake University

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Abstract

This study examined Deci's (Deci, E.F., Intrinsic Motivation. New York: Plenam Press, 1975) hypothesis concerning the effects of contingent rewards on intrinsic task interest. Forty-two high school psychology students worked puzzles involving the solution of anagrams and mazes under one of four possible conditions. Competence in task was made salient by verbal praise while in another verbal praise recognized the obligatory nature of the task performance. In a third condition, monetary rewards in increments of 25¢ with up to $1.00 were given as the tasks were performed to make salient "above average competence". In the fourth condition, subjects were told they would be paid one dollar for helping with the experiment. Dependent measures of intrinsic interest were two questions on a four-question post-experiment questionnaire and number of optional puzzle items completed after the timed experiment was completed. Subjects in the verbal praise for competence condition reported significantly higher task interest than those in the verbal feedback obligation condition. The verbal praise for competence subjects also scored significantly higher than the monetary payment for obligation subjects. Other mean scores were generally in the direction of supporting Deci's hypothesis.

A Validation of Cognitive Evaluation Theory

The role of money, as well as other types of feedback upon motivation to do a task or job, has long been of interest to managers in American business. Much has been invested in setting up merit compensation programs in the hope that job and task performance would be improved. Because of this, Deci's (Deci, 1975) work in cognitive evaluation theory concerning the effects of rewards on the intrinsic task motivation of an activity was of great interest to the author.

Deci (1975) articulated three major propositions of his cognitive evaluation theory.

"Proposition I of Cognitive Evaluation Theory:
One process by which intrinsic motivation can be affected is a change in perceived locus of causality from internal to external. This will cause a decrease in intrinsic motivation and will occur, under certain circumstances, when someone receives extrinsic rewards for engaging in intrinsically motivated activities."

"Proposition II of Cognitive Evaluation Theory:
The second process by which intrinsic motivation can be affected is a change in feelings of competence and self-determination. If a person's feelings of competence and self-determination are enhanced, his intrinsic motivation will increase. If his feelings of competence and self-determination are diminished, his intrinsic motivation will decrease."

"Proposition III of Cognitive Evaluation Theory: Every reward (including feedback) has two aspects, a controlling aspect and an informational aspect which provides the recipient with information about his competence and self-determination. The relative salience of the two aspects determines which process will be operative. If the controlling aspect is more salient, it will initiate the change in perceived locus of the causality process. If the informational aspect is more salient, the change in feeling of competence and self-determination process will be initiated."

The research with regard to Deci's three propositions has been considerable. Research in support of the proposition that the salience of the control aspect will lead a person to reattribute performance of a previously intrinsically interesting activity to the extrinsic reward has been reported by Lepper, Greene, and Nisbett (1973), Lepper and Greene (1975), and Ross (1975) in studies using children as subjects. Calder and Staw (1975), and Deci (1971 and 1972) found similar support with young adults as subjects. In general, this is a restatement of the over-justification hypothesis.

Deci (1975) indicated that the competence information aspect of any reward becomes salient when the subject believes the receipt of an award is contingent upon the successful performance of a task. He also suggested that while every reward has both control and competence information aspects, with some rewards one aspect is typically more salient. With money, for example, people may be more aware of the control aspect because of their previous experience with money

inducements such as receiving payment for doing a job where the money represents only a settlement of an obligation. Rewards such as social approval may create more awareness of the competence information aspect. Several studies were done to test those notions (Deci 1971, 1972) and Anderson, Manoogian, and Reznick (1976). Most studies provided a weak measure of support for Deci's theory.

Another aspect of the over-justification hypothesis examined dealt with the size of a reward, particularly a money reward. Calder and Staw (1975) and Lepper, Greene, and Nisbett (1973) suggested that only performance contingent rewards of relatively higher value would trigger the reattribution process and result in decreased intrinsic interest. Enzle and Ross (1978) suggested that "Reward value may have a very different effect, however, when the competence information aspect of the reward is salient, again due to commonly shared beliefs." They go on to say that if people believe they receive rewards that are commensurate with their task input including ability, the size of the reward indicates to them the value of their inputs. Thus, the size of an award has a great deal of competence information attached to it.

Enzle and Ross found that compared to high payment control subjects, subjects who received a task contingent high reward rated it as less interesting. Subjects who also received a high reward for performance level criterion rated the task more interesting. Also, subjects expressed less task interest after receiving the high task contingent reward than the low reward, but reported higher task interest with the high performance criterion reward than the low performance criterion reward.

Rosenfield, Folger, and Adelman (1980) reviewed prior studies as to whether contingent rewards based on task performance and non-contingent rewards based on mere task completion lead to decreases in intrinsic motivation. They noted the studies by Folger, Rosenfield, and Hays (1978) and Karniol and Ross (1977) which indicated that under certain conditions extrinsic rewards may increase intrinsic motivation. Other studies (Deci 1971 and 1972 and Kruglanski, Alon, and Lewis 1972) reported decreases in intrinsic motivation under contingent rewards. Yet Karniol and Ross (1977) showed that when rewards were allegedly contingent on skillful performance, intrinsic motivation was not decreased or in some cases was actually enhanced.

Rosenfield et al (1980) went on to test the hypothesis, "It's not the contingency per se, but rather whether the contingent rewards indicate substantial competence, that determines how the subject will respond to these rewards."

They tested 118 female introductory psychology students in four different conditions: (a) contingent/competency feedback, in which how much a subject earned allegedly depended on the number of work units completed (productivity) and the rate of pay per unit was supposedly based on the subject's ability, (b) contingent/no feedback, in which the earnings were said to be based on productivity, but the pay rate was determined independently of ability, (c) non-contingent/no feedback, in which a flat level of reward was given regardless of productivity and the determination of that level had no relationship to ability, and (d) no-pay/competency feedback, in which subjects were not paid for

their performance but were given information about their ability in the task. Rosenfield et al found that when rewards did not indicate level of ability, higher rewards led to less intrinsic motivation regardless of whether the rewards were contingent. But when the level of reward reflected ability, higher rewards which were supposedly related to greater skill led to greater intrinsic motivation.

Tho previous research reports much use of monetary rewards to give competence feedback in either contingent or non-contingent conditions but little use of verbal competence feedback on intrinsic interest. This study contrasted the effects on intrinsic interest of verbal praise in a competence salient condition versus an obligation salient condition. Further, the study compared verbal praises with monetary rewards where either competence or the obligation was made salient. Prior research and Deci's original propositions suggest that either verbal praise or monetary reward where competence is made salient will increase intrinsic task interest, while verbal praise or monetary rewards which make the obligation salient will decrease intrinsic task interest.

To test this hypothesis, this experiment included four types of feedback conditions: (a) contingent verbal competency feedback in which subject received praise ostensibly based on how well he or she was performing on task exercises; (b) non-contingent verbal obligatory feedback in which subjects received verbal praise as thank you and appreciation for willingness to assist in the research experiment; (c) contingent monetary competency feedback in which differential increments of money were said to represent varying degrees of above average task performance competency; and (d) non-contingent monetary

reward in which subjects were told they would receive a flat amount of money as payment for participating in the experiment.

Method

Subjects

Subjects were 42 high school juniors and seniors taking Introduction to Psychology. The subjects were in two classes, one of 25 and the other with 17 students. Students in the first class were randomly assigned to Conditions One and Two (13 and 12 students, respectively) and students in the second class were randomly assigned to Condition 3 (nine students) and Condition 4 (eight students). Subjects were given a choice of participating in the research study or being allowed to study regular classroom materials while the research was conducted.

Procedure

Students were told that they would be participating in an experiment to test their ability to alternate between verbal and spatial visualization tasks. A task questionnaire containing thirteen four- and five-letter anagrams which were presented alternately with twelve mazes was developed and students in each condition were given ten minutes to quickly work as many of the task items as possible. Upon completion of the time period, the students were told to stop and to circle the number of the last problem they were working on when time was called. Conditions were tested in separate rooms.

Students in the first class hour were assigned to Conditions 1 and 2 on a random count-off, 1-2, basis. The same procedure was used for the second class period where students were assigned to either Condition 3 or Condition 4.

Different procedures were used in each experimental condition. In Condition 1, verbal praise, competence salient, students were told before working the questionnaire to arrange their desks in a semi-circle facing outward (toward the walls) from the center of the room. This left a U-shaped open center in the room wherein the experimenter could walk around and observe students as they worked the puzzles. Before the experiment began, subjects were advised that "prior research has shown that there are wide ranges of ability in typical student groups in performing experimental tasks such as the ones you will get. Approximately 70% of any group will be "average", while 15% will be either below or above average performers. You will be advised periodically during the experiment how well you are doing. You will get verbal feedback as you go. Does everyone understand this?"

As the subjects worked, the experimenter appeared to make notes in a portfolio and observe each student several times. Each student was complimented at least once during the experiment on his or her ability and competence in doing the puzzles. Comments like "You are doing very well", "Say, you are really fast", and "That is one of the best jobs I've seen so far" were used. Immediately following completion of the experiment, subjects completed the post-experiment questionnaire and handed it in.

Puzzle booklets remained on the subjects' desks. After completion of the questionnaire, subjects were advised that in the remaining 15-20 minutes of the class hour, they had the option of studying regular class materials or working additional puzzles. They were advised that the puzzle booklets would be turned in at the end of the hour.

In Condition 2, subjects were seated in regular classroom style. Before they began the experiment they were told, "You don't know how helpful this is. Thanks so much." Other features of the condition were identical to Condition 1. There was no verbal competency feedback.

Condition 3 was also conducted in the open "U" seating arrangement with desks and subjects facing outward toward the walls. Subjects were advised that "prior research has shown that there are wide ranges of ability in typical student groups in performing experimental tasks such as the one you will get. Approximately 70% of any group will be "average" and 15% each will be either below or above aberage in performance. You will be compensated for your skill in accordance with how well you are doing on the puzzles. If you are above average, you will receive 25¢ at some point during your performance to compensate you for your merit. If you are exceptionally good, you could earn up to $1.00 if your performance merits it. Does everyone understand this?"

As the subjects worked the puzzles, the experimenter went around the room and ostensibly made notes about performance. After about three minutes, 25¢ was given in a personally conspicuous manner to various subjects. Over the course of ten minutes, all subjects "earned" at least 50¢ and a number got 75¢ or $1.00. No verbal feedback was given during the experiment. The rest of the experiment was conducted like the prior conditions.

Condition 4 was conducted in regular classroom style seating in the other classroom. Subjects were given the standard explanation of the purpose of the experiment and were told at the start that "we really appreciate your helping us out. Because of the effort and time involved,

each of you will be paid $1.00 to compensate you for your work." The rest of the experiment was conducted like the other conditions except there was no feedback of any kind for task ability or personal performance.

Results

The design was a 2 x 2 design where the independent variables were competence saliency or obligation saliency and type of reward which was either verbal praise or monetary reward. There were three dependent measures of intrinsic task interest -- Questions Two and Four on the post-experiment questionnaire and the number of optional puzzle items worked after the experiment was completed.

The questionnaire was a four-question Likert scale asking subjects to note their responses on a scale of one to nine. Questions One and Three were placebo-type questions relating to the difficulty of switching from anagrams to mazes and the subject's impression of feeling pressure of working under a time deadline.

Question Two, to measure intrinsic task interest, asked, "To what extent did you find the puzzle tasks as such (that is, apart from the experimental situation) interesting?" Question Four asked, "If you had a book of these types of puzzles, to what extent do you think you would want to work them in your leisure time?"

The mean responses for questionnaire items two and four were computed for subjects in each condition. In addition, the mean number of optional puzzle items worked by each condition was tabulated and computed. These results are shown in Table 1, Summary of Questionnaire Measures.

Insert Table 1 about here

Significance tests of differences between means were made after comparing for each condition Questions Two and Four and the optional puzzle items worked. Significant mean differences $t(23) = 2.993$, $p < .01$ was obtained for competence praise = 7.62 vs. obligatory praise = 6.08 in Conditions One and Two on Question Two, "To what extent did you find the puzzle tasks as such interesting?" Also, a significant mean difference was obtained between the verbal praise, competence salient condition (7.62) and the monetary award, obligation salient condition (6.13), $t(19) = 2.48$, $p < .025$.

No significant mean differences were obtained for other questionnaire item comparisons, although means were generally in the direction of supporting the hypothesis. In general, the variance of the differences between means was too great to yield statistically significant results.

A difference between means which was contrary to the hypothesized direction was obtained for Question 4 where Condition 3, monetary rewards, competence salient = 4.22 was less than Condition 4, monetary rewards, obligation salient = 5.75.

The mean number of extra puzzle items worked, Condition 2, verbal praise, obligation salient = 9.0, was greater than Condition 1, verbal praise, competence salient = 6.6. This difference, which is in a direction contrary to the prediction, was significant $t(23) = 1.92$, $p < .05$. The difference in mean number of puzzle items between

Condition 3 = 6.6 and Condition 4 = 4.9 was in the predicted direction, although not statistically significant. (See Table 2, Mean Number of Extra Puzzle Items Worked.)

Insert Table 2 about here

Discussion

In general, the results obtained supported the original hypothesis especially on Question Two of the dependent measures of intrinsic task interest. Verbal praise, competence salient resulted in significantly higher task interest than verbal praise, obligation salient. In addition, the mean of the monetary reward, competence salient condition was remarkably higher than the mean of the monetary reward, obligation salient condition. However, the difference was not statistically significant. The explanation may well lie in the fact that a smaller sample of subjects was involved -- nine and eight in each condition -- and this may have contributed to higher variance of the difference between means resulting in lack of statistical significance.

There was also a substantial difference between means for the second questionnaire measure of intrinsic interest, also in the direction of supporting the hypothesis. This difference was not significant, however, again apparently due to a high variance of the difference between means.

The difference between the means of the monetary rewards, competence salient condition and the monetary rewards, obligation salient condition was not in the direction of supporting the hypothesis.

However, even though monetary rewards, obligation salient subjects reported higher task interest, the difference was not statistically significant. While this is puzzling, the explanation may lie in the composition of the sample of subjects in those conditions.

The third dependent measure, the number of extra puzzle items worked, also resulted in somewhat of a reversal of expected results. Condition 1, the verbal praise, competence salient subjects actually worked significantly fewer extra items than did the Condition 2, verbal praise, obligation salient subjects. It should be noted, however, that the Condition One subjects worked an average of four more puzzle items (14.8 vs. 10.8) in the regular timed portion of the experiment than did the other subjects. This left them with fewer to do in the optional period. It is possible that those subjects felt better about their regular experimental performance as a result of contingent competence praise and felt less compelled to attempt additional items. The author noted that there appeared to be a lot of social pressure and competition to complete additional items among the subjects.

The comparison between the monetary rewards, competence salient and monetary rewards, obligation salient conditions was in the predicted direction although not statistically significant. Again, it appears that the smaller number of subjects in each condition may have contributed to high variance.

In examining the results of this study, it should be noted that there was substantial ability difference between the two classes of psychology students. The students in the second class who were given the monetary rewards experimental variable were poorer students. The

instructor reported that 35% of the class was receiving D's and E's. If this is so, it is possible that the class, in general, has a lower level of intrinsic interest in any tasks requiring intellectual ability such as puzzle completion.

Because of this possibility, a better experimental design would have been to manipulate all four conditions across both classes. This would have leveled out ability difference between the classes as well as resulted in having at least ten subjects per condition, which would have been desirable from a statistical standpoint. However, this was not possible because this would have required four rooms and four experimenters which simply were not available.

This study suggests that verbal praise for competence can be highly salient and may work to enhance intrinsic task interest more than differential amounts of money. This study supports the finding by Rosenfield et al (1980) that "...it is not surprising that these verbal rewards (which obviously imply competence) tend to lead to increases rather than decreases in intrinsic motivation."

It seems reasonable to suggest that further research testing the relative saliency of various kinds of contingent rewards upon intrinsic task interest may well be in order. If motivation in work is more influenced by verbal feedback and recognition than money, this has important implications for what might be expected from merit pay systems in use in business. The cheaper motivational alternative could be better training of managers and supervisors in recognition and feedback on competency.

Table 1

Summary of Questionnaire Measures

Questionnaire Question 2 - "To what extent did you find the puzzle tasks as such (that is, apart from the experimental situation) interesting?"

	VERBAL PRAISE	MONETARY REWARDS
COMPETENCE SALIENT	Condition 1 $\bar{y}$ = 7.62 N = 13	Condition 3 $\bar{y}$ = 6.78 N = 9
OBLIGATION SALIENT	Condition 2 $\bar{y}$ = 6.08 N = 12	Condition 4 $\bar{y}$ = 6.13 N = 8

Questionnaire Question 4 - "If you had a book of these types of puzzles, to what extent do you think you would want to work them in your leisure time?"

	VERBAL PRAISE	MONETARY REWARDS
COMPETENCE SALIENT	Condition 1 $\bar{y}$ = 5.69 N = 13	Condition 3 $\bar{y}$ = 4.22 N = 9
OBLIGATION SALIENT	Condition 2 $\bar{y}$ = 4.50 N = 12	Condition 4 $\bar{y}$ = 5.75 N = 8

Table 2

Mean Number of Extra Puzzle Items Worked

Condition 1 = 6.6

Condition 2 = 9.0

Condition 3 = 6.6

Condition 4 = 4.9

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